

Remarks/Arguments

Reconsideration and allowance of this application are respectfully requested.

Currently, claims 1-14 are pending in this application.

Allowable Subject Matter:

Applicant notes with appreciation the Examiner's indication that claims 1-10, 13 and 14 are allowable.

Rejections Under 35 U.S.C. §103:

Claim 11 was rejected under 35 U.S.C. §103 as allegedly being unpatentable over Zhang et al (U.S. '043, hereinafter "Zhang") in view of Abe (U.S. '910). Applicant respectfully traverses this rejection.

In order to establish a *prima facie* case of obviousness, all of the claim limitations must be taught or suggested by the prior art. The combination of Zhang and Abe fails to teach or suggest all of the claim limitations. For example, the combination fails to teach or suggest "an air-fuel ratio arithmetic unit for calculating, as the air-fuel ratio, a minimum value of air-fuel ratio values detected and output by the air-fuel ratio detection unit during supply of the secondary air provided by the secondary air supply mechanism," as required by independent claim 11.

Col. 1, lines 56-59 (specifically identified by the Office Action) of Abe states "The control unit 15 further comprises air-fuel ratio calculation means 6 for calculating an air fuel ratio from a **minimum value of the flame resistance** detected by the electrode plug 18 (emphasis added)...." In contrast, the invention of claim 11 calculates, as the air-

fuel ratio, a minimum value of air-fuel ratio values output by a air-fuel ratio detection unit during supply of the secondary air.

Rather than determining a minimum value of air-fuel ratios as required by claim 11, Abe explicitly teaches determining a minimum value of flame resistance. In more detail, Abe discloses detecting an air-fuel ratio with an oxygen sensor 14. The minimum value of flame resistance detected by electrode plug 18 is merely used as a correction factor to correct the air-fuel ratio detected by oxygen sensor 14. Since Abe merely discloses a minimum value of the flame resistance being only used to correct the air fuel ratio detected by oxygen sensor 14, Abe fails to disclose calculating, as the air-fuel ratio, a minimum value of air-fuel ratio values, let alone calculating, as the air fuel ratio, a minimum value of air-fuel ratio values detected during supply of the secondary air.

When the secondary air is introduced into the exhaust passage in the invention required by claim 11, the air and the exhaust gas are mixed together, so that the air-fuel ratio in the exhaust passage may fluctuate. In order to correctly detect the air-fuel ratio in the exhaust passage, the minimum value of the air-fuel ratio is most effective.

Accordingly, the invention of claim 11 requires that minimum value be calculated as the air-fuel ratio. Neither Abe nor Zhang acknowledges the above-noted problem, nor contemplates the solution of calculating a minimum value of the air-fuel ratio. In contrast, Abe merely discloses calculating the minimum value of flame resistance.

Accordingly, Applicant respectfully requests that the rejection of claim 11 under 35 U.S.C. §103 be withdrawn.

Claim 12 was rejected under 35 U.S.C. §103 as allegedly being unpatentable over Zhang in view of Mitsutani (U.S. '421). Applicant respectfully traverses this rejection.

Claim 12 requires, *inter alia*, “an air-fuel ratio arithmetic unit for calculating, as the air-fuel ratio, an output value detected by the air-fuel ratio detection unit at a specified crank angle during supply of the secondary air provided by the secondary air supply mechanism.”

When the secondary air is introduced into the exhaust passage, the air-fuel ratio fluctuates according to the combustion period. The air-fuel ratio detected at a specified crank angle with respect to the combustion period has a high correlation with a combustion air-fuel ratio, and the air-fuel ratio detected at another crank angle has a high correlation with the air-fuel ratio of the gas which is introduced into the catalyst.

According to the invention of claim 12, the air-fuel ratio is calculated at a specified crank angle during supply of the secondary air. This enables the combustion and the catalyst to be appropriately controlled.

Mitsutani fails to disclose calculating, as the air-fuel ratio, an output detected at a specified crank angle during supply of secondary air. Moreover, in Mitsutani, the combustion air-fuel ratio is periodically changed in order to detect a deterioration of the catalyst, and the differences in the changing amount of air-fuel ratio between the upstream and the downstream of the catalyst are compared with each other to correct the characteristic of the sensor upstream of the catalyst. The fluctuation of the air-fuel ratio shown in Mitsutani's drawings is intentionally generated to accurately detect the deterioration of the catalyst and to calculate the oxygen absorbing power of the catalyst. The fluctuation of the air-fuel ratio is thus established without respect to the combustion interval of the engine. Mitsutani thus fails to appreciate the benefits of appropriately controlling the combustion and the catalyst.

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Accordingly, Applicant respectfully requests that the rejection of claim 12 under 35 U.S.C. §103 be withdrawn.

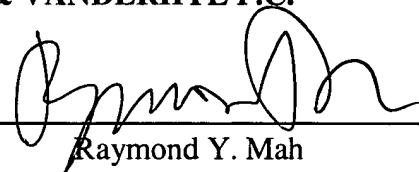
Conclusion:

Applicant believes that this entire application is in condition for allowance and respectfully requests a notice to this effect. If the Examiner has any questions or believes that an interview would further prosecution of this application, the Examiner is invited to telephone the undersigned.

Respectfully submitted,

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By: _____



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